SGS-THOMSON MICROELECTRONICS

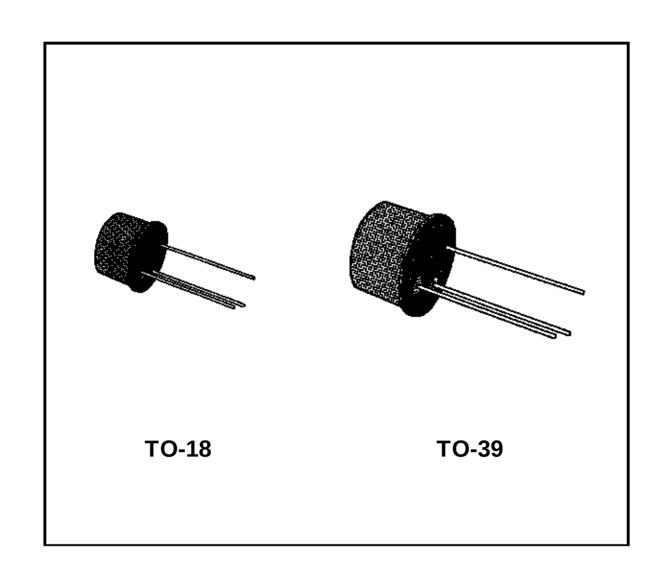
2N2904/2N2905
2N2906/2N2907

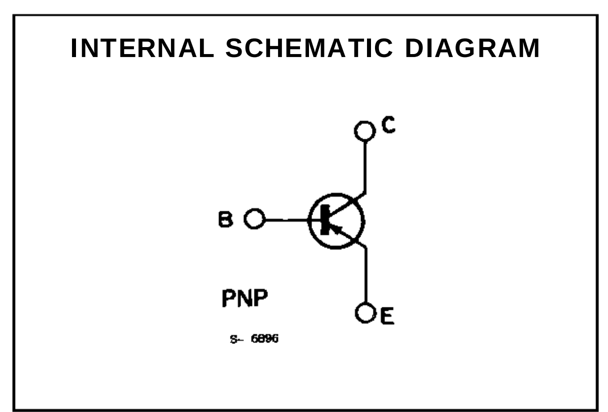
GENERAL PURPOSE AMPLIFIERS AND SWITCHES

DESCRIPTION

The 2N2904, 2N2905, 2N2906 and 2N2907 are silicon planar epitaxial PNP transistors in Jedec TO-39 (for 2N2904, 2N2905) and in Jedec TO-18 (for 2N2906 and 2N2907) metal cases. They are designed for high-speed saturated switching and general purpose applications.

 2N2904/2N2905 approved to CECC 50002-102, 2N2906/2N2907 approved to CECC 50002-103 available on request.





ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage (I_E = 0)	– 60	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	– 40	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	– 5	V
I_C	Collector Current	– 600	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C for **2N2904** and **2N2905** for **2N2906** and **2N2907** at $T_{case} \leq 25$ °C for **2N2904** and **2N2905** for **2N2906** and **2N2907**	 0.6 0.4 3 1.8	 W W W W
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200	°C

THERMAL DATA

			2N2904 2N2905	2N2906 2N2907
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	58.3 °C/W	97.3 °C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	292 °C/W	437.5 °C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

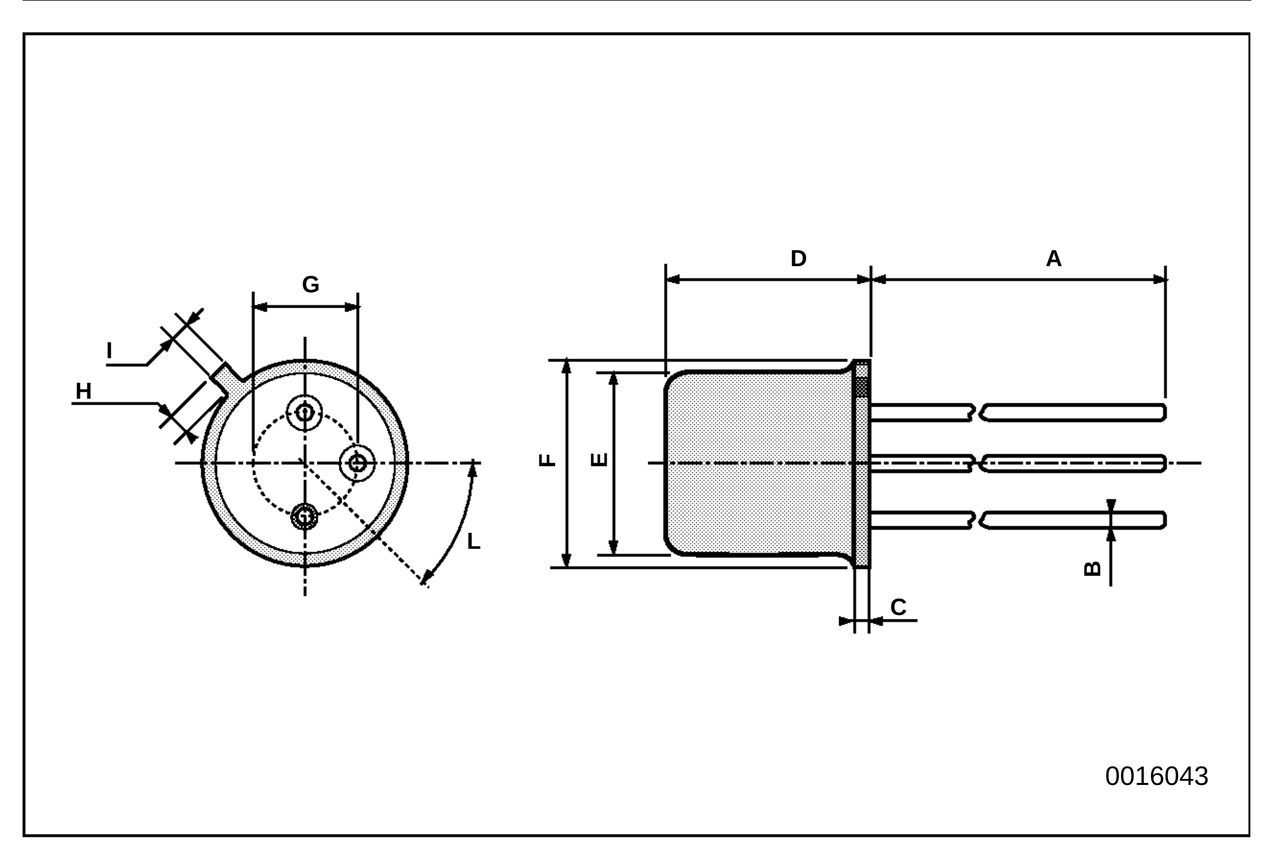
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = – 50 V V_{CB} = – 50 V T_{amb} = 150 °C			– 20 – 20	nA μA
I_{CEX}	Collector Cutoff Current (V_{BE} = 0.5 V)	V_{CE} = – 30 V			– 50	nA
I_{BEX}	Base Cutoff Current (V_{BE} = 0.5 V)	V_{CE} = – 30 V			– 50	nA
$V_{(BR)\ CBO}$	Colllector-base Breakdown Voltage (I_E = 0)	I_C = – 10 μA	– 60			V
$V_{(BR)CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = – 10 mA	– 40			V
$V_{(BR)\ EBO}$	Emittter-base Breakdown Voltage (I_C = 0)	I_E = – 10 μA	– 5			V
$V_{CE\ (sat)}$*	Collector-emitter Saturation Voltage	I_C = – 150 mA I_B = – 15 mA I_C = – 500 mA I_B = – 50 mA			– 0.4 – 1.6	V V
$V_{BE\ (sat)}$*	Base-emitter Saturation Voltage	I_C = – 150 mA I_B = – 16 mA I_C = – 500 mA I_B = – 50 mA			– 1.3 – 2.6	V V
h_{FE}*	DC Current Gain	for **2N2904** and **2N2906** I_C = – 0.1 mA V_{CE} = – 10 V I_C = – 1 mA V_{CE} = – 10 V I_C = – 10 mA V_{CE} = – 10 V I_C = – 150 mA V_{CE} = – 10 V I_C = – 500 mA V_{CE} = – 10 V	 20 25 35 40 20		 120 	
h_{FE} *	DC Current Gain	for **2N2905** and **2N2907** I_C = – 0.1 mA V_{CE} = – 10 V I_C = – 1 mA V_{CE} = – 10 V I_C = – 10 mA V_{CE} = – 10 V I_C = – 150 mA V_{CE} = – 10 V I_C = – 500 mA V_{CE} = – 10 V	 35 50 75 100 30		 300 	
f_T	Transition Frequency	I_C = – 50 mA V_{CE} = – 20 V f = 100 MHz	200			MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 V_{EB} = – 2 V f = 1 MHz			30	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = – 10 V f = 1 MHz			8	pF
t_d	Delay Time	I_C = – 150 mA V_{CC} = – 30 V I_{B1} = – 15 mA			10	ns
t_r	Rise Time	I_C = – 150 mA V_{CC} = – 30 V I_{B1} = – 15 mA			40	ns
t_s	Storage Time	I_C = – 150 mA V_{CC} = – 6 V I_{B1} = – I_{B2} = – 15 mA			80	ns
t_f	Fall Time	I_C = – 150 mA V_{CC} = – 6 V I_{B1} = – I_{B2} = – 15 mA			30	ns

* Pulsed : pulse duration = 300 μs, duty cycle = 1 %.



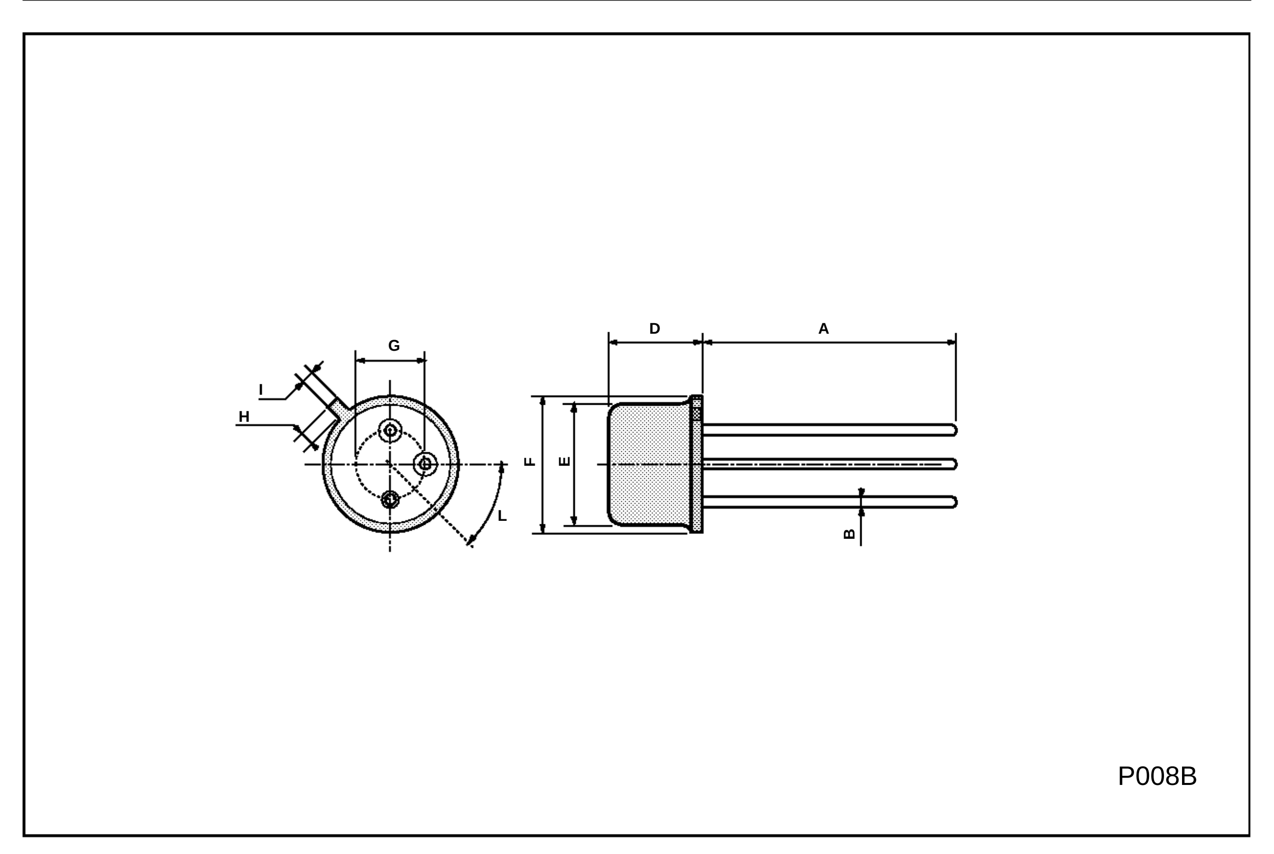
TO-18 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45^o			45^o		



TO39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45^o (typ.)					



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